

CLAIMS

1. A substrate for thin film formation in which a thin film comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and the substrate consists of a sintered compact which comprises an aluminum nitride as the main ingredients.

2. A substrate for thin film formation in which a thin film comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and the substrate consists of a sintered compact which comprises as the main ingredients a ceramic material which has at least one of the crystal structures selected from a hexagonal system or a trigonal system.

3. A substrate for thin film formation in which a thin film comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and the substrate consists of a sintered compact which comprises a ceramic material as the main ingredients and which has optical permeability.

4. A manufacture method of the substrate for thin film formation in which a thin film comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and the substrate consists of a sintered compact which comprises an aluminum nitride as the main ingredients, the method comprises using as a raw material at least one of raw materials using respectively alone of either which is selected from what is made by reduction of an aluminum oxide and what is made by direct nitriding of metal aluminum, or using the mixture of what is made by reduction of an aluminum oxide and what is made by direct nitriding of metal aluminum, to form the sintered compact.

5. A manufacture method of the substrate for thin film formation in which a thin film comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and the substrate consists of a sintered compact which comprises an aluminum nitride as the main ingredients, the method comprises firing the powder compact or sintered compact which comprise an aluminum nitride as the main ingredients for not less than 10 minutes at the temperature not less than 1500 degrees C in non-oxidizing atmosphere to form the sintered compact.

6. A sintered compact which comprises an aluminum nitride as the main ingredients, in which the content of at least one or more ingredients selected from a rare earth element and an alkaline-earth metal is a total of not more than 0.5 weight % by element conversion, oxygen content is not more than 0.9 weight % by element conversion, AlN is not less than 95 % as a crystal phase, the size of an aluminum nitride particle is not less than 5 μm , and having optical permeability.

7. A sintered compact which comprises a zinc oxide as the main ingredients and contains an aluminum ingredient at least and which has optical permeability.

8. A thin film substrate in which the thin film comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and is formed on the sintered compact which comprises an aluminum nitride as the main ingredients.

9. A thin film substrate in which the thin film comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and is formed on the sintered compact which comprises as the main ingredients a ceramic material which has at least one of the crystal structures selected from a hexagonal system or a trigonal system.

10. A thin film substrate in which the thin film which comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and is formed on the sintered compact which comprises a ceramic material as the main ingredients and which has optical permeability.

11. A thin film substrate in which an optical waveguide is formed on the sintered compact which comprises an aluminum nitride as the main ingredients by the thin film which comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients.

12. A manufacture method of a thin film substrate in which a thin film which comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients is formed on the sintered compact which comprises an aluminum nitride as the main ingredients, and the thin film is formed using the organic compound of at least one or more elements selected from gallium, indium, and aluminum as a main raw material and using at least one or more elements selected from ammonia, nitrogen, and hydrogen as a reactive gas.

13. A manufacture method of a thin film substrate in which a thin film which comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients is formed on the sintered compact which comprises an aluminum nitride as the main ingredients, and the thin film is formed using the halogenated compound of at least one or more elements selected from gallium, indium, and aluminum as a main raw material and using at least one or more elements selected from ammonia, nitrogen, and hydrogen as a reactive gas.

14. A manufacture method of a thin film substrate in which a thin film which comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients is formed on the sintered compact which comprises as the main ingredients a ceramic material which has at least one of the crystal structures selected from a hexagonal system or a trigonal system, and the thin film is formed using the organic compound of at least one or more elements selected from gallium, indium, and aluminum as a main raw material and using at least one or more elements selected from ammonia, nitrogen, and hydrogen as a reactive gas.

15. A manufacture method of a thin film substrate in which a thin film which comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients is formed on the sintered compact which comprises a ceramic material as the main ingredients and which has optical permeability, and the thin film is formed using the organic compound of at least one or more elements selected from gallium, indium, and aluminum as a main raw material and using at least one or more elements selected from ammonia, nitrogen, and hydrogen as a reactive gas.

16. An optical waveguide which comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients and which contains at least one or more ingredients which are selected from niobium and tantalum.

17. An optical waveguide which consists of a bulk single crystal which comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients.

18. A light emitting device constituted by laminating the N type semiconductor layer, luminescence layer, and P type semiconductor layer which consist of a thin film which comprises

at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and the laminated body of N type semiconductor layer, luminescent layer, and P type semiconductor layer is being formed on the sintered compact which comprises an aluminum nitride as the main ingredients.

19. A light emitting device constituted by laminating the N type semiconductor layer, luminescence layer, and P type semiconductor layer which consist of a thin film which comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and the laminated body of N type semiconductor layer, luminescent layer, and P type semiconductor layer is being formed on the sintered compact which comprises as the main ingredients a ceramic material which has at least one of the crystal structures selected from a hexagonal system or a trigonal system.

20. A light emitting device constituted by laminating the N type semiconductor layer, luminescence layer, and P type semiconductor layer which consist of a thin film which comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and the laminated body of N type semiconductor layer, luminescent layer, and P type semiconductor layer is being formed on the sintered compact which comprises a ceramic material as the main ingredients and which has optical permeability.

21. A substrate for light emitting device mounting in which a light emitting device comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and the substrate consists of a sintered compact which comprises an aluminum nitride as the main ingredients and which has optical permeability.

22. A substrate for light emitting device mounting in which a light emitting device comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and the substrate consists of a sintered compact which comprises an aluminum nitride as the main ingredients and which formed the reflective prevention material.

23. A substrate for light emitting device mounting in which a light emitting device comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and the substrate consists of a sintered compact which comprises an aluminum nitride as the main ingredients and which formed the reflective material.

24. A manufacture method of the substrate for light emitting device mounting in which a light emitting device comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and the substrate consists of a sintered compact which comprises an aluminum nitride as the main ingredients, the method comprises using as a raw material at least one of raw materials using respectively alone of either which is selected from what is made by reduction of an aluminum oxide and what is made by direct nitriding of metal aluminum, or using the mixture of what is made by reduction of an aluminum oxide and what is made by direct nitriding of metal aluminum, to form the sintered compact.

25. A manufacture method of the substrate for light emitting device mounting in which a light emitting device comprises at least one or more materials selected from a gallium nitride, an indium nitride, and an aluminum nitride as the main ingredients, and the substrate consists of a sintered compact which comprises an aluminum nitride as the main ingredients, the method comprises firing the powder compact or sintered compact which comprise an aluminum nitride as the main ingredients for not less than 10 minutes at the temperature not less than 1500 degrees C in non-oxidizing atmosphere to form the sintered compact.